

SPECIFICATION AND ASSESSMENT GUIDE FOR THE VOLUNTARY CARBON MARKET

1. Background

QCI's assessments of carbon offsets reflect a range of projects and project types designed to bring price transparency to the burgeoning offset market. Offsets are typically demarcated into three types – those that reduce emissions, those that avoid them and those that remove them.

With thousands of companies pledging net zero targets or goals to cut emissions of greenhouse gases, many plan to rely on offsetting to mitigate the climate impact of hard-to-abate sectors.

Over the past decade several standards have emerged and have been embraced by the industry. Typically these standards govern the methodologies that project developers must follow and outline rules for validation and verification. They also typically issue and retire credits as well as operate a registry.

As there are thousands of projects with a growing number of standards, QCI has devised project-specific assessments for the largest projects that sell offsets into the market as well as baskets of projects to help its clients assess the value of what they are buying and selling.

2. Broad methodological principles

QCI adheres to a set of key principles when making its assessments.

Those are:

- to reflect trades, transacted at arms-length in an open and transparent manner;
- in the absence of trade, to reflect value lying between firm bids and offers;
- in the absence of physical data, to reflect prices in relation to liquid derivatives on the last known value; and
- to ensure data is verifiable with market sources and provided by recognised buyers, sellers and intermediaries.

3. Data collection

QCI carbon credit assessments are derived from data collected in the marketplace in the form of bids, offers and trades in both the OTC and exchange market (trade information).

QCI has established relationships with a growing number of intermediaries, buyers and sellers and has signed non-disclosure agreements with several of these in order to collect more data from the marketplace.

This data is communicated directly to the editorial team in Paris, Dubai and London by buyers, sellers and intermediaries throughout the day via email, instant messaging and by phone.

The data submitted is in the form of outright indications, price spreads to futures contracts or price spreads to other projects or project types.

The data is then analysed against liquid futures instruments and time adjusted via static spreads on days where volatility exceeds 5%.

4. Data analysis

When assessing the data QCI follows four key principles

- Verification
- Normalisation
- Repeatability
- Prevailing value

4.1 Verification - QCI makes every effort to verify trade information to ensure it is open to the market, executable by the majority of the marketplace and transacted at an arm's length. QCI recognises the challenge of verifying information individually and undertakes to do so with all price submitters to validate the information is correct. This may be done electronically and by telephone.

4.2 Normalisation - As many indications will not be heard at exactly the time in question, QCI uses three key principles to normalise market information heard prior to the timestamp in question. Information heard after the timestamp will not be used. Those principles are time of trade information, specification of the product, and volume.

4.2.1 Time – On days where there is excess volatility in the marketplace (>5% from the time of trade to the assessment stamp at 1630 London time) trade information may be normalised to price movement in a more liquid asset class, such as futures on an exchange.

4.2.2 Specification - Each assessment published by QCI has its own list of standard specifications to reflect a project type, a project type in a geographical location, a project type according to a specific standard and individual projects. QCI may use trade information outside the scope of these parameters to adjust the price of assessments. This includes using price information for certain vintages to determine the price of other vintages of the same project or project type, or the same vintage of similar projects.

4.2.3 Quantity - Each assessment has a defined minimum and maximum quantity that QCI considers as reflective of market size. QCI reserves the right to normalise smaller or larger deals outside of this range to within the specified range in consultation with the marketplace.

4.3 Repeatability - Where market data is conflicting, QCI applies a test of repeatability to determine fair value. As such, firm and transparent bids and offers closer to the timestamp will be considered ahead of trades executed earlier in the day. Where two trades for the same volume are executed at the same time, QCI may use a test of repeatability to determine which one reflects better fair value in consultation with the marketplace.

4.4 Prevailing value - QCI uses a concept called “prevailing market value” to determine whether trades reported represent fair value. Conceptually, the prevailing value is the theoretical value of the commodity in the absence of any market information. In some cases, it will be the same flat price as per the previous day, while in others it will be in relation to a more liquid exchange-contract in the event that the assessment has a close relationship to the futures contract. One example of the latter would be nature-based solutions and the CME/CBL contract for the N-GEO.

5. Clip size

Each assessment has a minimum clip size to reflect where liquidity is pooled and this is displayed both on the assessment page and in this document.

6. Timestamp

All assessments are timestamped at 1630 London time.

ASSESSMENTS

1. Introduction

Quantum publishes seven types of carbon offsets designed to aid price discovery in a market that has a plethora of standards, projects and project types.

The value of offsets is often determined by the project or the project type, the volume bought and sold, the geography of the project, the standard issuing the credit, the period in which the reduction or avoidance occurred (vintage) and even the project developer.

Therefore, unlike other commodities or asset classes, the voluntary offset market cannot be defined in a handful of assessments.

As QCI assesses baskets of projects, or project types, in each case the cheapest project or project type sets the price.

QCI acknowledges this has limited use and to provide greater transparency, QCI has broadened its assessment suite to include more specific criteria to improve price transparency.

2. Classifications of offsets assessed

The classifications applied by QCI include.

Standardised Offsets

Kyoto Markets

Renewable Energy

Nature-based

Energy Efficiency

Quantity Premiums

Crypto Assets

Below is a summary of each classification

Standardised Offsets

These comprise of the most common futures contract traded in the market and the assessment reflects the value at 1630 London time each day. Data is taken from a host of sources, including exchanges and the OTC market.

They include

Corsia Eligible Offsets (CEO) that reflect carbon credits eligible for the International Civil Aviation Organization's Corsia programme. Under ICAO, airlines have pledged to halt the growth of emissions in the sector. This is a major source of demand for offsets and the full eligibility criteria can be found at <https://www.icao.int/environmental-protection/CORSIA/Pages/default.aspx>.

Nature Based Offsets (NBO) that originate from reducing or avoiding emissions from the Agriculture, Forestry and Other Land Use (AFOLU) sector with additional Climate, Community and Biodiversity (CCB) accreditation from the Verra emissions registry. AFOLU requirements cover a wide range of project types, from Improved Forest Management and Avoided Deforestation (also known

as REDD) to Wetlands Restoration and Conservation as well as the Avoided Conversion of Grasslands and Shrublands. All eligible AFOLU project types are considered such as REDD/REDD+, no till farming, wetland management, soil sequestration (including biochar), reforestation and afforestation projects.

Tech Based Offsets (TBO) that represent emissions avoided or reduced from the technology-based sector that are ineligible for Corsia registration. Such projects include renewable energy and landfill gas.

Clean Cookstoves Offset (CCO) that represent the value of a voluntary carbon credit produced by clean cookstove projects under the Voluntary Carbon Standard (VCS) or the Gold Standard (GS), with at least five UN Sustainable Development Goals (SDGs).

Kyoto markets

These assessments reflect the value of offsets that have their origin in the Kyoto Protocol's Clean Development Mechanism – the UN offset scheme that commenced in the 2000s and was designed to help countries with emission reduction targets under Annex B of the Protocol to meet their goals through investing in emission reduction projects in non-Annex B nations. The carbon currency was known as certified emission reductions, or CERs.

They include:

CER CP1 20kt which reflects the value of a CER from the first commitment period (CP1) of the Kyoto Protocol (2008–2012). All eligible project types, excluding industrial gas projects, are considered. Renewable energy projects, such as wind and solar, will typically set the price of this assessment.

CER CP2 (2013+) 20kt which reflects the value of a CER from the second commitment period (CP2) of the Kyoto Protocol (2013–2020). All eligible project types, excluding industrial gas projects, are considered. Renewable energy projects, such as wind and solar, will typically set the price of this assessment.

Renewable Energy

These assessments typically reflect the price of emission reduction projects that originate from the displacement of fossil fuels through the investment in renewable energy in a country's grid and issued by the two main standards – VCS (Verra) and Gold Standard.

They include:

VCS Corsia-eligible hydro projects. This assessment represents the value of one Voluntary Carbon Standard (VCS) credit created from the hydropower sector, where emission reductions took place from 2016 onwards, and compliant with the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) scheme created by the International Civil Aviation Organization (ICAO). They typically set the Corsia-eligible offset price.

VCS Corsia-eligible solar, wind and waste-to-energy projects. These assessment represents the value of one Voluntary Carbon Standard (VCS) credit created from the renewable energy sector, where emission reductions took place from 2016 onwards, and comply with the Corsia scheme. All renewable energy projects are considered, except hydropower.

VCS Corsia-ineligible solar, wind and waste-to-energy projects. This assessment represents the value of one Voluntary Carbon Standard (VCS) credit created from the renewable energy sector,

where emission reductions took place either before 2016 or after or in Asia or outside of Asia. All renewable energy projects are considered, except hydropower and energy efficiency.

VCS hydro/energy efficiency. These assessment represents the value of one Voluntary Carbon Standard (VCS) credit created from the hydropower and energy efficiency sectors, where emission reductions took place from 2016 onwards or from after 2016. All projects are considered, with the cheapest technology setting the daily price.

GS Corsia-eligible hydro. This assessment represents the value of one Gold Standard (GS) credit created from the hydropower sector, where emission reductions took place from 2016 onwards.

GS Corsia solar/wind/waste to energy. This assessment represents the value of one Gold Standard (GS) credit created from the renewable energy sector, where emission reductions took place from 2016 onwards.

Vintage premiums. These assessments reflect the price premia or discount of various renewable energy credit vintage years in relation to the year 2016. They apply to both VCS (Verra) and Gold Standard (GS) credits.

Nature-based

These assessments reflect the price of projects that protect standing forests or seek to regrow them and are issued by VCS (Verra), the dominant standard in the space. All main project types (avoided deforestation; improved forest management; afforestation, reforestation and restoration) are covered. However, in practice avoided deforestation (also known as REDD) credits usually set the price of our baskets as they tend to be cheaper than other asset classes.

Our assessments include:

VCS REDD+ CCB Gold project and vintage-specific assessments. The projects meet Verra's Climate, Community & Biodiversity Gold Standards (CCB Gold Standards), the highest possible distinction for social and biodiversity co-benefits in forest projects. Only avoided deforestation projects are considered here. QCI currently assesses seven individual vintages for five projects: Envira Amazonia (VCS1382), Kariba (VCS902), Katingan (VCS1477), Southern Cardamom (VCS1748) and Rimba Raya (VCS674).

VCS Forestry baskets split by region and vintage type. We currently assess three major regions (Africa, Americas, Asia) and two vintage types (pre- and 2016+ vintages). These baskets reflect projects ineligible for Verra's CCB Standards. The 2016 cutoff was chosen to reflect prevailing buying patterns and is likely to evolve over time.

VCS Blue carbon represents the value of VCS credits created from mangrove restoration and reforestation and blue carbon projects, where emission reductions took place from 2016 onwards.

ACR/CAR Forestry represents the value of one voluntary carbon credit from the Agriculture, Forestry and Other Land Use (AFOLU) sector and registered in either the American Carbon Registry (ACR) or the Climate Action Reserve (CAR). All projects are considered, but the price typically reflects improved forest management (IFM) projects that are most common in North America.

Afforestation, Reforestation and Restoration (ARR) projects in China and Uruguay, registered under the Voluntary Carbon Standard (VCS). Typical projects in China use local species planted on barren lands such as spruce, pine, cypress, savin and fir, while in Uruguay projects tend to be

eucalyptus monocultures on degraded lands. Other types of ARR projects and reforestation projects within other Latin American countries are taken into account but may be normalised.

Household Devices

These assessments reflect the price of credits generated from household devices, issued by VCS (Verra). Emissions are typically avoided by installing more efficient cooking devices that burn less wood or use a different feedstock altogether. Investments into cookstove projects have boomed in the last few years, helped by quick return rates and as these credits typically include co-benefits, such as reduced indoor air pollution, that can be monetised.

A typical deal size of 20,000 tonnes is reflected, although some of our Gold Standard indices reflect a 100,000 tonne deal size. All cookstove types (charcoal, biomass, LPG, water purifiers) are considered with the cheapest technology setting the price.

Our assessments include:

VCS Clean cookstoves (Africa). This assessment represent the price of clean cookstove credits generated in Africa that meet the VCS standard. All African countries are eligible with the price typically set on the cheapest project available. We reflect two vintage types (pre- and 2016+ vintages). The 2016 cutoff was chosen to reflect prevailing buying patterns and is likely to evolve over time.

VCS Clean cookstoves (India). This assessment represents the value of a voluntary carbon credit produced by clean cookstove projects in India and registered under the VCS, where emission reductions took place from 2016 onwards.

GS Clean cookstoves Africa. This assessment represents the value of a voluntary carbon credit produced by clean cookstove projects in Africa and registered under the Gold Standard. Five countries are typically assessed at par: Kenya, Uganda, Somalia, Nigeria and Ghana. Other African countries and newly producing regions within the five mentioned countries may be normalised. Typically, the projects reflect at least four UN Sustainable Development Goals (SDGs). Unlike other indices in this category, this assessment is vintage-specific.

Quantity Premiums

These assessments reflect the price premia or discount of various OTC deal sizes in relation to the 20,000 tonne standard size reflected in most of our indices. They apply to all types of credits, whether from the renewable energy, household devices or nature-based sectors.

Crypto Assets

These assessments reflect the price of different carbon-related crypto assets (Klima DAO, Toucan BCT, Toucan NCT). In the past two years, some companies have transformed carbon offsets into crypto tokens that can be traded on the blockchain.